# Parental Mobile Control System for Children's Internet Use

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*Abstract*— **As children nowadays are getting smarter and more technology wise compared to their own parent, the combination of traditional education method with the technology had help to equip the children with skills regarding to the technology. Even though having all this early exposure towards technology wise is a good idea, however we still need to consider the capability of children at their early stage to able to differentiate between right and wrong. Without a proper guidance and observation, these children might be trapped in between the contentment that technology can possible offer. To prevent more serious cases from happening, an action should been taken. Hence, this paper proposes a parental mobile Control system to monitor their child activities over the Internet. The system contains capturing, detecting and blocking modules that help to prevent the access of adultery sites.**

***Keywords-component; Internet, Parent, Traffic Monitoring, Children***

## I. INTRODUCTION

Traffic monitoring system is actually one of the mechanisms implemented and can be considered as the backend process for Parental Mobile Control (PMoC). Basically, this system is integrated inside the PMoC by using a network technology such as socket programming as a middle interface between the Android-based Smartphone and the computer accessed by a child. It allows activities for incoming and outgoing traffic from a computer used by the child, where it focuses mainly on capturing a particular traffic that is the *http* traffic. All the traffic accessed will first appear to the parent and need an acknowledgment before it can access the Internet. Then upon accessing, all the traffic is checked and applied with the related modules of traffic monitoring system. PMoC is actually developed by using Android platform as the system and an interface for the parents to monitor their child activities through Android-based Smartphone. This gives the freedom of mobility and conveniences to the parents.

There have been various cases regarding to the teenagers especially such as running away from home and following the strangers, using their mobile phone to send Short Message Service (SMS) that consist of horny words among couples, downloading pornographic videos and images, accessing unrated websites and so on. All these behaviors started from a child accessing all of them through Internet and these are considered unhealthy and need to be prevented. As a parent, for not considering any of the consequences, are like giving them a green light to do whatever they think right but is actually wrong. As a matter of fact, with the emerging of more advanced technologies and applications available out there, data can easily be access anywhere using wireless devices and even being downloaded with just one touch of a finger. This phenomenon can later contributed to the misuse of technologies, if it is not properly countered by the parent themselves. Therefore, this project is dedicated in helping parents to monitor and prevent unwanted activities or accessed by child and avoids technology abuse.

In this paper, we present a related work on traffic monitoring system in Section II. In Section III discusses the system architecture and implementation. The system evaluation is presented in Section IV. The paper concludes in Section V.

## II. RELATED WORKS

There are few techniques that being used nowadays for traffic monitoring. Cisco [1] introduces a basic architecture which has three fundamental Quality of Service (QoS) implementations. First is QoS identification and marking techniques for coordinating QoS from end-to-end between network elements. Second is QoS within a single network element (queuing, scheduling, and traffic-shaping tools). Third is QoS policy, management, and accounting functions to control and the administer end-to-end traffic across a network.

The authors present a design and implementation of a portable, web-based network traffic monitoring and analysis system called WebTrafMon [2]. This web-based technology enables users to be free from complex user interfaces, while allowing monitoring and analysis results to be viewed from anywhere by just using widely available web browsers. WebTrafMon provides monitoring and analysis capabilities not only for traffic loads but also for traffic types, sources and destinations. WebTrafMon consists of two parts: a probe and a viewer. The probe extracts raw traffic information from the network, and the viewer provides the user with analyzed traffic information via web browsers. Meanwhile, the authors in [3],[4] describe that a mobile agent provides a solution to software problems in a networked environment that fits more naturally with a real world. Mobile agent technology can make distributed systems more adaptable to application needs especially in mobile environment. A use of mobile code makes distributed systems and the abstractions where it

 

provides more flexible to build and use. Therefore, a model for distributed and network management with mobile agents that can analyze data and make decisions in order to preserve the reliability and QoS for the end users.

The authors [5],[6],[7] are focusing on the security and the development of an application over Android open source software platform. The author [5] focuses on providing a secure communication channel by using HTTPS protocol. It uses a public key infrastructure, also known as asymmetric encryption such as public keys and digital certificates. The author in [6] tried to adopt the concept of Service-based Mobile Applications (SMAs) to overcome the limitation where some functionality are offloaded or provided as a service. This is due to a limitation of resource for mobile devices, where it is difficult to run complex applications on the devices. Apart from that, they also perform a commercial-level SMA system development, called Mobile Mate Service (MMS) which reveals a number of key features which are worth to explore. As for the author in [7] proposed a mechanism to improve the traditional surveillance system by identifying the weaknesses and proposed a new surveillance scheme based on Android Smartphone. The system architecture is divided into two levels which are a server and a client that uses socket programming architecture to listen to the communication, while another one is to providing the information. This proposed architecture does solve the weakness of the old surveillance system where it used to be inflexible.

## III. PARENTAL MOBILE CONTROL SYSTEM

Parental Mobile Control using a socket programming as a middle interface between the Android-based Smartphone and the computer accessed by a child. It allows the activities for incoming and outgoing traffic from a computer used by a child, where it focuses mainly on capturing a particular traffic such as http traffic. All the traffic accessed will first appear to the parent and need an acknowledgment before it can access Internet. Then upon accessing, all the traffic is checked and applied with the related modules. Prototyping is a process of developing a temporary clone as an overview for the actual system. Therefore, a simple and working prototype for a user interface is developed during the design phase to show how the early system will look like.

The advantage of using prototype technique is that it allows developers to observe early functionality and gather fast feedback. Apart from that, it provides risk control for developers and users by allowing early testing to be done. Prototyping offers many benefits for users and systems developers which could helps to avoid misunderstandings. However, the rapid pace of development can create quality problems where in a very complex system a prototype could become difficult to manage. Figure 1 shows a part of mobile agent development.

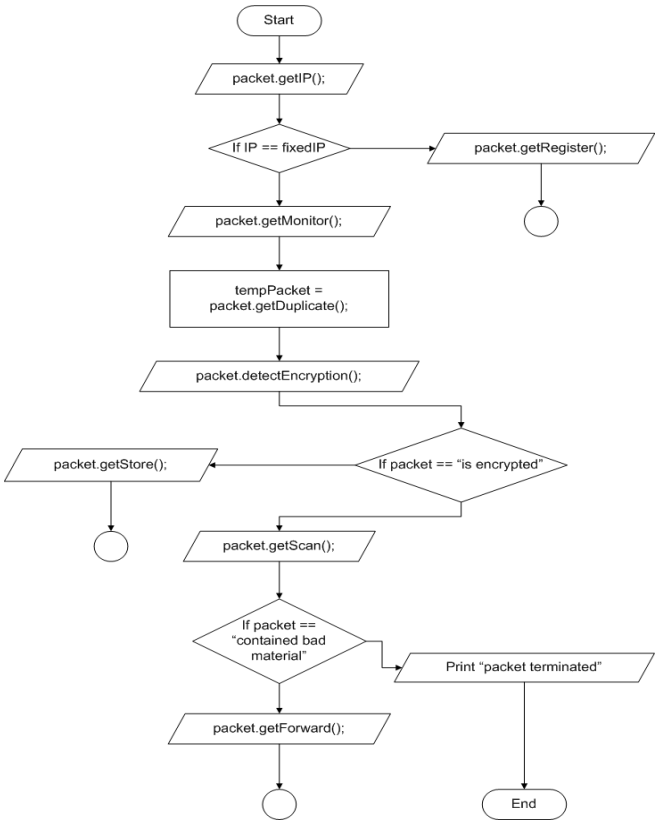


Figure 1. Flow Chart of Mobile Agent Development

## IV. IMPLEMENTATION

In the design phase, the Netbeans IDE was chosen as a development tool to develop the Parental Mobile Control System (See Figure 2). Eclipse IDE is used by integrating the Android SDK to make the module implementation function properly. Furthermore, Eclipse IDE is more compatible and is a recommended environment for developing Android application. Android SDK also works the best with Eclipse IDE without much error compared to Netbeans IDE. While a java programming is used to develop modules such as blocking, forwarding and cache. Java programming is also used to create multiple mobile agents. The interface of Parental Mobile Control is developed by using an Android Mobile Emulator. The modules that discussed previously are integrated together inside Eclipse IDE.

In order to evaluate the system, we have conducted several tests on Internet activities. An agent named as a Mobile Content Agent (MCA) is created to detect some keywords entered by the users. The MCA must be able to carry out several concurrent tasks in response to different external events. In every agent created, it composed of a single execution thread and implemented as an object. MCA has some specifications that support the states as follows:

- **INITIATED**: the agent responded to the request initiated by the user and forwarded to a second mobile agent to update in the cache or database.

- **ACTIVE**: the agent created in the systems are activated when the system are connected to the Internet.
- **SUSPENDED**: the agent is stopped and no agent behavior is being executed.
- **WAITING**: the agent is in the waiting mode when the internal thread (e.g. Java monitor) is sleeping and in its active mode.
- **DELETED**: the agent created can be deleted and at this stage the agent is definitely in dead mode.
- **TRANSIT**: is a state where the agent is migrating to a new location in the system. The messages are buffered while waiting for agent migration.

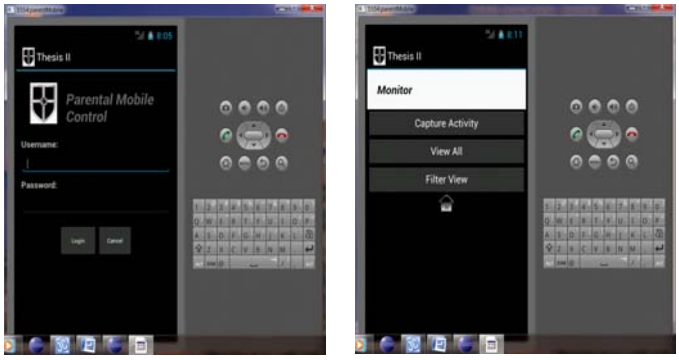


Figure 2. Parental Mobile Control User Interface

The mobile agent class provides a public method to perform transitions between the various states. For example, doWait() method puts the mobile agent into a waiting state from ACTIVE state, doSuspend() method puts the mobile agent into SUSPENDED state from ACTIVE or WAITING state. The mobile agent is allowed to execute its behaviors or tasks only when it is in the ACTIVE state. The two other methods, doMove() and doClone() of the mobile agent class allow it to migrate elsewhere or to spawn a remote copy of itself under a different name. A method named doMore() carries a single parameter to represent the intended destination for the migrating agent. Figure 3 and 4 show the examples activities related to the active mobile agents. The system detected the keywords entered by child and the parent could initiate a request to block the access.

## V. CONCLUSION

Parental Mobile Control is developed by using Android platform as the system and an interface for the parents to monitor their child activities through Android-based Smartphone. This gives the freedom of mobility and conveniences to the parents to monitor their child's Internet activities anywhere they want.

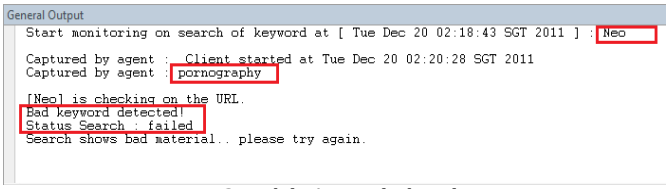


Figure 3. Mobile Agent Block Bad URL

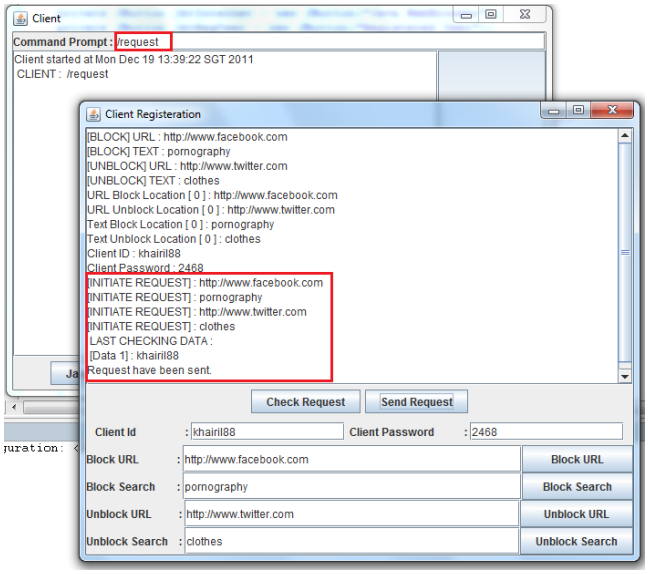


Figure 4. Mobile Agent Block Bad URL

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